

## Using a DOT's Intergraph Data in an ESRI Environment

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## Interoperability – Why?

There are very few single-vendor DOTs anymore.

DOTs have multiple platforms and products, intentionally or not

- "Best tool for the job"

DOTs have to work together with local partners

Everything has to work together, eventually.



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## Interoperability – Why?

Intergraph-based DOTs are adding ESRI and other GIS products

- ArcView or ArcInfo for environmental analysis
- TransCAD for modeling and distance matrices

ESRI-based DOTs are adding Intergraph and other GIS products

- WebMap for information delivery
- Spatial RDBMS tools for management



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## Interoperability – Why?

DOTs, MPOs, RPCs, Counties, other state agencies, other planning groups all find themselves having to share data and processes

- Framework data
- Transportation management systems
- ITS



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## Interoperability - Focus

Intergraph-based DOTs have to share data with partners who use ESRI products

- Internal & external

The data is roadway-based

- Graphic data are road centerlines
- The partner wants to use the DOT's attribute data
- Linear Referencing System (LRS) is used to locate data



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## GeoDecisions Approach

Develop Transportation Information Systems to distribute DOT data to MPO, LDD, and County planning groups

Distribute data to other Department groups



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## Interoperability - Assumptions

The agency GIS is Intergraph's MGE

- Segment Manager for the LRS
- LRS is NLF-ID, Begin, End
  - Could be Begin and Length, etc.
- RIS for attribute data to an RDBMS
- GeoMedia for data translation



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## Interoperability - Assumptions

The partner is using ArcView or ArcInfo

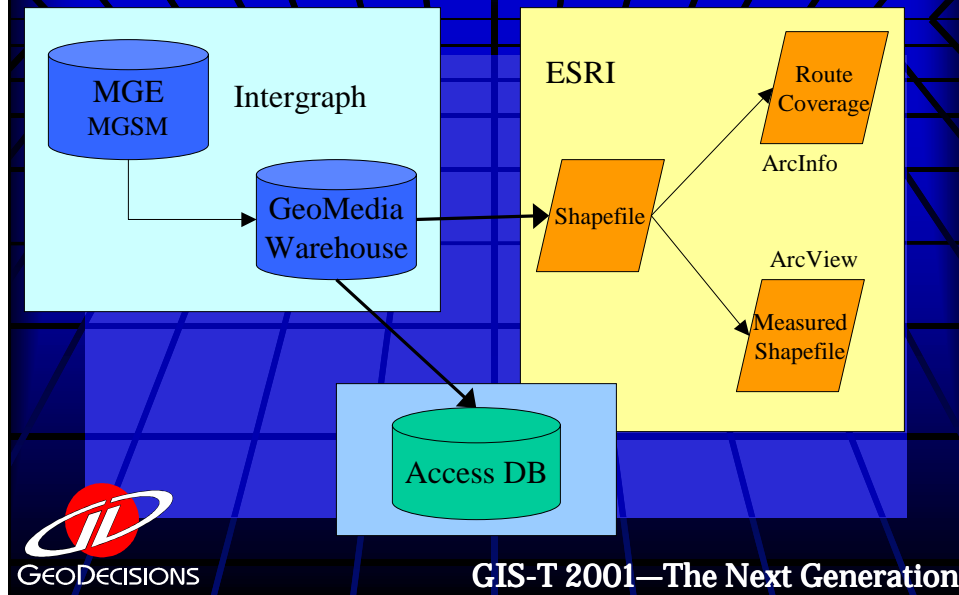
- LRS route system(s) constructed in ArcInfo (Workstation), or
- Measured shapefiles built in ArcView (3.x)
- Data use in ArcInfo or ArcView

Assume no SDE or ArcGIS use now



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## How To Do It - Briefly



## How To Do It - Intergraph

Use GeoMedia to create a warehouse from the MGE project

- Load the roads and LRS from Segment Manager
- Create Access tables to hold the needed attribute information, with LRS keys
- Output a shapefile with the NLF-ID field, begin and end measures
- Send the Access database and shapefile files to the partner

## How To Do It - ESRI

### Construct a Route Coverage

- Convert shapefile to line coverage
- Create route system

The following steps should be completed in ArcInfo. This assumes a shapefile called lrs\_rt\_1099 has been provided from GeoMedia or by other means and has at least the line data fields lrs\_key, beg\_cnty\_1, end\_cnty\_1. An ArcInfo coverage can also be used, eliminating the first step.

**Arc:** shapearc lrs\_rt\_1099 lrsrt - create the coverage lrsrt from the shapefile.

Create the ArcInfo route system using the LRS identifier and appropriate route measurements.

**Arc:** arcsection lrsrt cntyl lrs\_key beg\_cnty\_1 end\_cnty\_1

lrsrt - LRS coverage  
cntyl - the route system; this can be any name  
lrs\_key - LRS identifier  
beg\_cnty\_1 - LRS beginning route measure  
end\_cnty\_1 - LRS ending route measure



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## How To Do It - ESRI

### Construct a Measured Shapefile

- Convert shapefile as PolyLine to PolyLineM
- Interpolate Begin and End measures to the PolyLineM
- Requires Avenue coding scripts



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## Simple Example

Use a bridge database to locate bridges on the road network

Data table has LRS key field and milepost value to tie to network

LRS_KEY	File_CD	Route	Begin_Milepost	Lrs_key	Roadroute-id
K-7376-01	K	31	40	002K0003100	10
K-7437-01	U	59	16	002U0005900	13

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## Select the LRS

A route coverage can be created for each Department LRS

Lrs_key	Beg_cnty	End_cnty	Beg_state	End_state	Beg_cnty_la	End_cnty_la	Beg_state_a	End_state_a	Beg
001K0000000	0.00000	0.63800	0.00000	0.63800	0.00000	1.12300	0.00000	1.12300	
001K0020300	0.00000	0.63300	0.00000	0.63300	0.00000	1.01900	0.00000	1.01900	
001K0022400	0.00000	1.03900	0.00000	1.03900	0.00000	1.67200	0.00000	1.67200	
001K0026900	0.00000	3.07300	0.00000	3.07300	0.00000	4.94600	0.00000	4.94600	
001U0005400	0.00000	24.38700	328.05700	352.44400	0.00000	39.24700	527.95800	567.20500	
001U0005900	0.00000	21.19300	64.54400	85.73700	0.00000	34.10700	103.87400	137.98100	
001U0016900	0.00000	23.01200	54.32300	77.33500	0.00000	37.03400	87.42500	124.45900	
001U001690R	0.00000	11.07300	0.00000	11.07300	0.00000	17.82000	0.00000	17.82000	
002K0003100	0.00000	20.68200	60.70500	81.38700	0.00000	33.28500	97.69500	130.98000	
002K0003100	39.10600	44.12500	99.81100	104.83000	62.93500	71.01200	160.63100	168.70800	
002K0005700	0.00000	7.12700	146.69900	153.82600	0.00000	11.47000	236.09000	247.55900	
002K000570R	0.00000	2.30000	0.00000	2.30000	0.00000	3.70100	0.00000	3.70100	
002U0005900	0.00000	28.52500	85.73700	114.26200	0.00000	45.90700	137.98100	183.88700	

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## Build the Route Coverage

Arc: shapeare lrs\_rt\_1099 lrsrt - create the coverage lrsrt from the shapefile.

Create the ArcInfo route system using the LRS identifier and appropriate route measurements.

Arc: arcsection lrsrt cntyl lrs\_key beg\_cnty\_l end\_cnty\_l

lrsrt - LRS coverage

cntyl - the route system; this can be any name

lrs\_key - LRS identifier

beg\_cnty\_l - LRS beginning route measure

end\_cnty\_l - LRS ending route measure

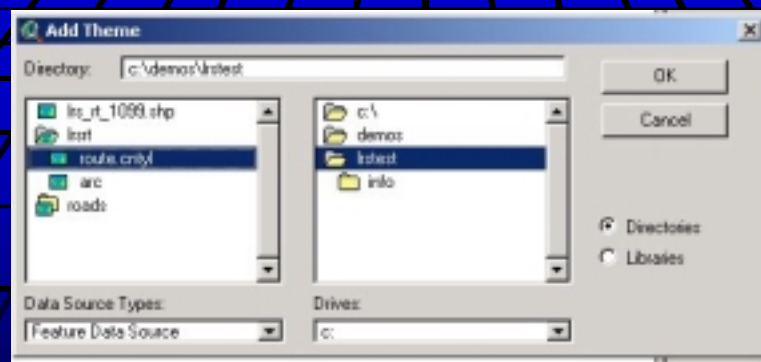
The beg\_cnty\_l and end\_cnty\_l measures were chosen arbitrarily for this example. There are other route measures evident in the road data that may be more appropriate for use. The table shows these measure fields.



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## Add the Route Coverage in ArcView



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## Add the Bridge Table

Set an ODBC  
Connection to the  
Access Database

Select the Table and any  
appropriate SQL queries  
with ArcView's  
SQLConnect dialog

SQL Connect

Connection: KDOT Bridges

Tables: Table1

Columns: <All Columns>, J\_PROJ\_NU, Rte\_CL, Route, Begin\_Milepost, Lrs\_key

Owner:

Select: \*

from: Table1

where:

Output Table: Bridges



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## Add the Bridge Table

test1.apr

New Open Add

Bridges

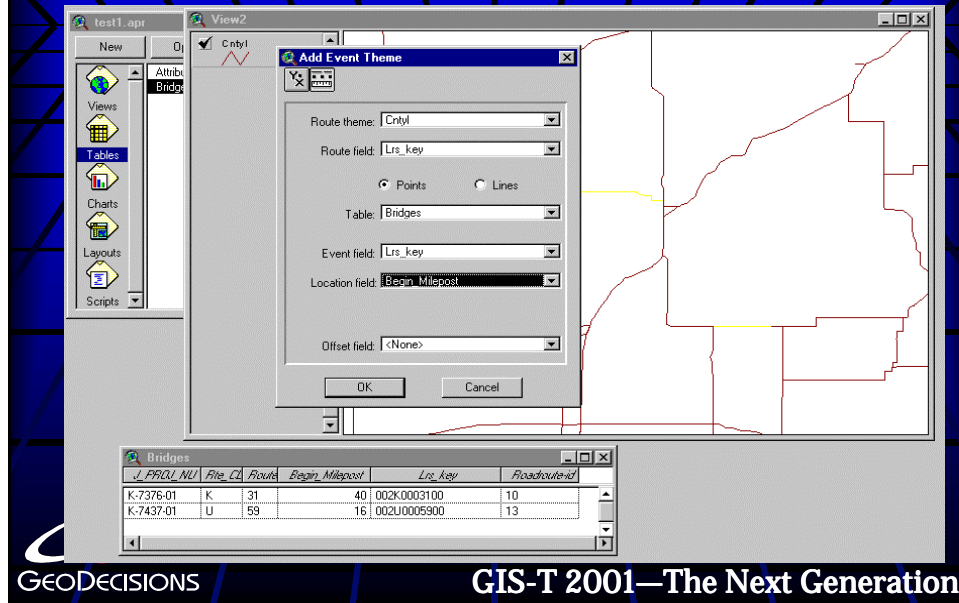
Bridges

J_PROJ_NU	Rte_CL	Route	Begin_Milepost	Lrs_key	Roadroute-id
K-7376-01	K	31	40	002K0003100	10
K-7437-01	U	59	16	002U0005900	13

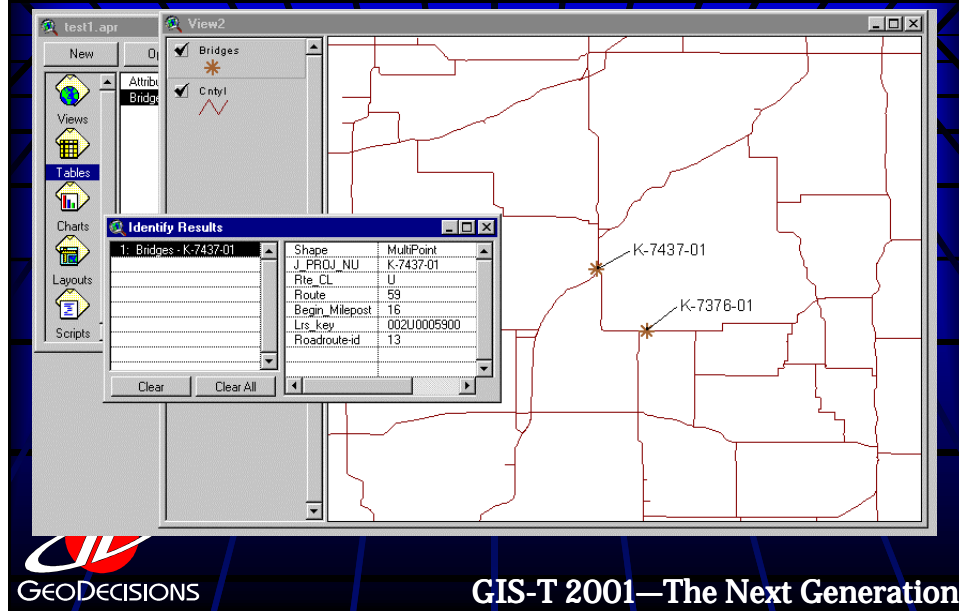


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## Add the Bridges as an Event Theme (Dynseg)



## Display the Bridges



## Example - Complex

Transportation Information System for  
MPOs, LDDs, and Counties in  
Pennsylvania

Uses PennDOT LRS and event tables to  
allow local planners access to roadway  
information



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## Example - Complex

PennDOT uses Intergraph GIS products

- MGE, GeoMedia

Roadway, Bridge and Project Management  
Systems in Oracle

GeoMedia is used to port data to ArcView

- Shapefile of State Roads with NLF as attributes
- Access database created from Oracle data



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## Example - Complex

Arc/Info is used to create a State Road route system based on NLF

- Currently maintained as an Arc/Info coverage
- ODBC Driver to use the Access database
- Series of SQL Connect scripts to use tables

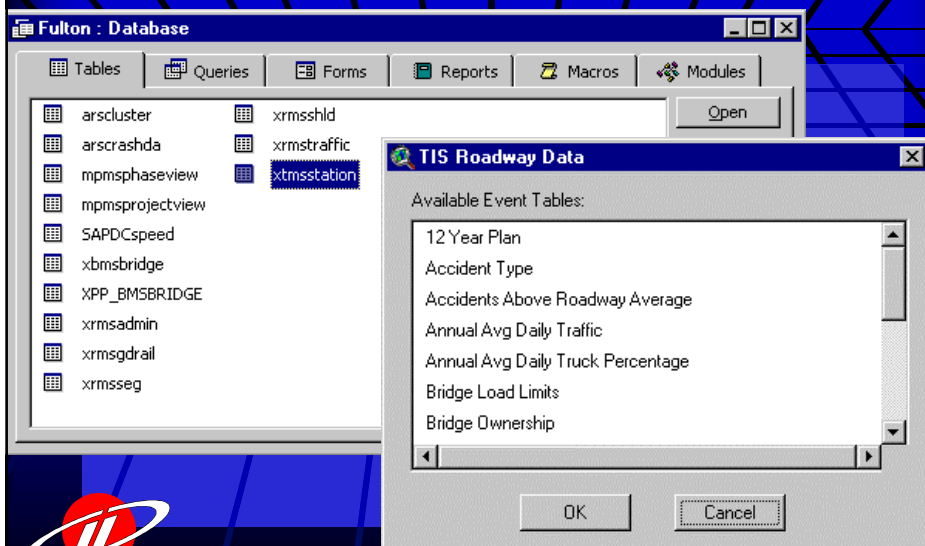
Data Exchange Procedures are Established

- PennDOT supplies new data to MPO or RPO
- Counties can provide data back to PennDOT
  - Road names, addresses



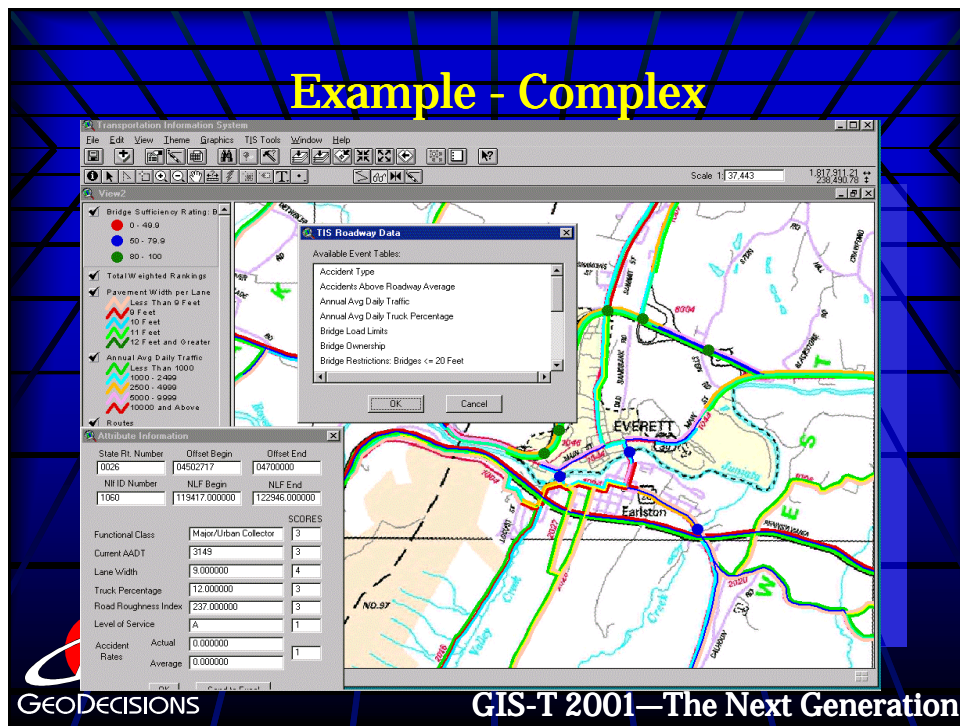
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## PennDOT Databases



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## Example - Complex



## Information

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